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ABSTRACTS

from

TRANSACTIONS published in JAPANESE

(Pages refer to the Japanese originals of this volume unless otherwise noticed)

On the Physiological Difference between 1,3- and 2,3-Butylene Glycols.

(pp. 1019~1022)

By Kinichiro SAKAGUCHI and Osamu KANBAYASI.

(Agricultural Chemical Laboratory, Tokyo Imperial University; Received Oct. 21, 1939.)

(1) The synthetic media, which contain 1,3- and 2,3-butylene glycols, glycerin or aethylene glycol (each in 2%) as the sole sources of carbon, were inoculated with five species of moulds, five species of yeasts and ten species of bacteria. The rate of growth of the orgnisms and the formation of reducible matters in the media were then investigated.

(2) 2,3-butylene glycol was utilized almost in the same degree as glycerin, while 1,3-butylene glycol was not assimilated by all species except *Oidium lactis* and *Bacillus mesentericus*. It seemed to exert even an inhibitory effect upon the growth of some species in the above concentration.

(3) Ethylene glycol was utilized by *Bac. mesentericus* and all species of moulds tested, i. e. *Aspergillus oryzae* A, *Penicillium glaucum*, *Rhizopus chinensis*, *Monilia fructigena* and *Oidium lactis*.

Studies on the Yeasts Found on "Miso" (Supp. Contributions)

Part 2. Physiological properties.

(pp. 1023~1036)

By Masatoshi MOGI.

(The Brewing Laboratory of Noda Shoyu Co. Ltd., Noda-machi, Chiba-ken, Japan; Received Sept. 5, 1939.)

Phosphoric Acid Absorption of Soils in Tyosen. III.

(pp. 1037～1041)

By Misu-Hideo.
(Agricultiral Experiment Station, Goverment General of Tyosen; Received Aug. 28, 1939.)

On the Fermentation Degumming of Waste Silk. Part V.

A Useful Thermophilic Bacteria for Fermentation Degumming.

(pp. 1042～1044)

By Hideo Katagiri and Toshio Nakahama.
(Agr. Chemical Laboratory, Kyoto Imperial University and Kanebo Silk Factory;
Received Oct. 19, 1939.)

Twelve strains of thermophilic bacteria were isolated from the degumming liquid under a high temperature.

An aerobic bacillus was found to be most effective for degumming of raw silk, when pure fermentations of the silk were carried out at 55°C with all the bacteria isolated.

The useful bacillus was concluded to reveal very much the same nature as *Bacillus robustus* Blau, and its degummase easily dissolved out into the cultural solution during 5 days' incubation, as was already ascertained with *Bacillus cereus sp.* (see Part IV).

On the Enzymic Action of Nucleotid-like Substances. (3)

(pp. 1045～1046)

By Tetutaro Tadokoro and Naomoto Takasugi.
(Hokkaido Imperial University; Received Sept. 30, 1939.)

The Influence of Monochromatic Lights on the Action of the Enzymes. [Report XXII～XXIII]

Especially on the Influence of the Same Intensity of Visible Absorbed Rays.

(pp. 1047～1051)

By Reitaro Murakami.
(Agricultural College, Utunomiya; Received Oct. 10, 1939.)

An electric lamp was used in order to investigate the influence of the visible rays on the action of the saccharase and proteinase in the yeast.

The enzyme solutions were irradiated through the layer of copper sulphate solution and the monochromatic filters of red, green, blue and violet, and com-

pensated to the same intensity of the absorbed rays. Colorless and black filters passing respectively all and no visible rays were also applied for controls.

The preparation of the enzymes, the measurement of the enzyme action and the other treatments were the same as in the author's previous papers.(1)

In this experiment, the actions of the yeast saccharase and proteinase were promoted by the visible monochromatic lights. The promotion was found to be stronger under the rays of shorter wave length and to become gradually weaker with longer wave lengths.

(1) Bull. Agri. Chem. Soc. (Japan), **15**, 45 (1939); **15**, 78 (1939).

Researches on Bamboos in Taiwan as a Raw Material for Pulp. Part II.

Especially on the ashes of "α-cellulose" originated from the pulps treated with 17.5% NaOH.

(pp. 1052~1056)

By Minoru Tutiya and Masao Imai.

(Industrial Reserch Institute of Taityu, Taiwan; Received Oct. 12, 1939.)

Using about four kinds of bamboos in Taiwan, the bleached pulps obtained

Table I

Quantity of Ashes and Percentage of its Components.

Components / Ash. (%)			Ash	SiO_2	Fe_2O_3	SO_3	P_2O_5	CaO	MgO	MnO	K_2O	Na_2O	Total
Kei-tiku	Bamboo		1.77	12.20	4.86	1.70	1.62	1.78	0.97	1.94	12.70	56.30	94.07
	Bleached	Pulp	0.522	67.50	12.83	1.78	—	8.29	0.27	1.64	0.79	3.68	96.80
		α-Cellulose	0.213	50.92	29.57	4.92	—	1.64	—	0.50	1.64	5.33	94.51
	Un-bleached	Pulp	0.531	43.78	10.35	9 56	—	6.92	7.24	2.50	13.38	3.02	96.85
		α-Cellulose	0.457	55.27	10.90	7.27	—	9.34	3.75	1.25	1.38	3.73	92.89
Matiku	Bamboo		4.31	14.90	10.27	1.23	0.61	1.43	2.05	3.70	12.90	47.20	94.68
	Pulp		1.078	55.75	16.36	2.10	—	6.70	1.77	2.57	12.53	2.17	99.95
	α-Cellulose		0.258	19.07	34.53	4.55	—	18.42	4.16	5.72	6.64	0.82	93.91
Shitiku	Bamboo		2.54	8.15	7.00	4.33	0.50	5.99	1.91	4.34	16.00	47.50	95.72
	Pulp		0.158	10.88	12.95	2.59	—	43.17	2.02	1.73	16.70	2.90	92.94
	α-Cellulose		0.102	19.46	22.93	4.12	—	35.27	2.15	0.75	4.86	1.78	92.32
Mosotiku	Bamboo		1.18	14.10	8.60	2 30	2.50	2.80	1.40	3.70	27.50	34.00	96.90
	Pulp		0.823	19.59	18.58	7.52	—	13.52	5.52	6.19	18.12	5.28	94 30
	α-Cellulose		0.344	51.54	18.51	4.15	—	2.24	0.83	4.62	9.87	5.55	97.31
α-Cellulose of artifitial silk pulp		Ooji	0.156	43.72	10.77	2.92	—	4.87	—	—	2.47	30.56	95.31
		Raynier	0.023	37.25	27.45	3.88	—	9.80	—	—	9.80	5.88	94.06

Table II.

m. g. of the components to 100 gm of Bamboo and Percentage.

Ash.			Components / m.g. %	SiO_2	Fe_2O_3	SO_3	P_2O_5	CaO	MgO	MnO	K_2O	Na_2O	Total
Kei-tiku	Bamboo			215.94	86.02	30.09	28.63	31.50	17.16	34.33	224.79	996.51	1,665.01
	Bleached	Pulp.	m.g.	118.16	22.45	3.11	—	14.50	0.47	0.28	1.38	6.44	166.79
			%	54.71	26.09	10.33	0	46.03	2.73	0.81	0.61	0.64	10.00
		α-Cell.	m.g.	29.02	16.85	2.80	—	0.93	—	0.28	0.93	3.03	53.84
			%	13.43	19.59	9.30	0	2.95	0	0.81	0.41	0.30	3.23
	Unbleached	Pulp.	m.g.	83.61	19.76	18.25	—	13.21	6.22	4.77	25.54	5.75	187.11
			%	38.71	22.97	60.65	0	4.19	26.24	13.89	11.36	0.57	11.23
		α-Cell.	m.g.	69.64	13.73	9.16	—	11.76	4 73	1.57	1.73	4.69	117.01
			%	32.24	15.96	30.21	0	3.73	19.81	4.57	0.76	0.47	7.02
Ma-tiku	Bamboo			642.19	442.62	53.01	26.29	61.63	88.35	159.47	555.99	2,034.32	4,063.88
	Pulp.		m.g.	156.10	45.80	5.88	—	18 76	4.95	7.19	35.08	6.07	279.93
			%	24.30	10.34	11.09	0	30.43	5.60	4.50	6.30	0.29	6.88
	α-Cell.		m.g.	9.34	16.91	2.22	—	9.02	2.03	2.80	3.25	0.40	45.97
			%	1.45	3.82	4.18	0	14.63	2.29	1.75	0.58	0.01	1.13
Shi-tiku	Bemboo			207.01	177.80	109.98	12.70	152.14	48.51	110.23	406.64	6,206.50	2,431.51
	Pulp.		m.g.	3.80	4.53	0.90	—	15.10	0.70	0.60	5.84	1.01	32.48
			%	1.36	2.54	0.81	0	9.92	1.44	0.54	1.43	0.01	1.33
	α-Cell.		m.g.	3.67	4.35	0.78	—	6.70	0.40	0.14	0.92	0.33	17.29
			%	1.77	2.43	0.70	0	4.40	0.82	0.12	0.22	0.005	0.71
Moso-tiku	Bamboo			166.38	101.48	27.14	92.50	33.04	16.52	43.66	324.50	401.20	1,143.42
	Pulp		m.g.	99.53	37.53	15.19	—	27.31	11.50	12.50	36.60	10.64	250.80
			%	59.82	36.98	55.96	0	82.65	69.61	28.63	11.27	2.65	21.93
	α-Cell.		m.g.	29.37	10.55	2.36	—	1.27	0.47	2.63	5.62	3.16	55.43
			%	17.65	10.38	8.69	0	3.84	1.84	6.02	1.73	0.78	4.84
m. g. in Pulp 100 gm													
Ooji-Pulp				60.76	14.96	4.05	—	6.76	—	—	3.43	42.47	132.43
Raynier				8.19	5.76	0.81	—	2.05	—	—	2.05	1.23	20.09

by the nitric acid process, and the "α-cellulose", originated from the pulps treated with 17.5% NaOH, the principal components of the ashes were determined quantitatively and analytically as above. (Table I, II).

1. The principal components of the ashes in the pulps and the "α-celluloses" are silicates and ferric (or ferrous) compounds. There is no general peculiarity of chemical behaviours in the ashes, some being more soluble and others not. The more soluble ones, on the whole, contain smaller quantities of ashes.
2. Phosphoric comounds in the original bamboos are entirely dissolved out in the process of pulp manufacturing.
3. The large quantities of potassium and sodium salts in the ashes of the original

bamboos, are almost dissolved away in the process, so that the existence of these compounds in the ashes of the original materials are not so troublesome for pulp making.

4. In estimation of the kinds of bamboos for pulp making, the most recommendable one is "Shitiku", followed by "matiku" "keitiku" and "mosotiku" in the order given.
5. Phosphates, potassium and sodium salts are most easily dissolved away, this suggests that those components probably exist in the same salts or in the same conditions in plants.

Biochemical Studies on the Sexual Organs of the Silk Worm, *Bombyx mori* L.

Part III. On the catalase of the sexual glands (ovary and testis).

(pp. 1057～1064)

By Takeo NAKASONE.

(Mie Sericultural Experiment Station; Received Sept. 20, 1939.)

The author studied the catalase actions of the testes and the ovaries of *Bombyx mori* in various developmental stages, respiration injuries due to the enamel sealing of the stigmata, influence of extirpating one gland of a pair in a silk worm larva after the 4th moulting and finally some properties of the catalase in the sexual glands of the full grown larva. The results may be summarized as follows:

1. The optimum conditions for the catalase in the ovaries and the testes are about pH 6.60 in reaction and about 22°C in temperature, but the activities gradually become weaker after thirty minutes even under these conditions.
2. Activities of the catalase in the ovaries and the testes show two cycles according to the development of the silk worm after the 4th moulting, one in the larval stage and the other in the pupal stage.
3. There seems to be almost no changes in the catalase actions of the remaining gland, when one of a pair of glands were removed at the early period of the 5th larval stage.
4. The catalase action of the sexnal glands became very meak when the abdominal stigmata of one side of the silkworm were sealed with enamel in the larval stage, but there was no influence if sealed in the pupal stage.
5. The catalase actions of the mature eggs (with chorion) in the ovarian tubes are not recognized.

Studies on the Mucilage from *Rhodophyceae*. (III).

On Physical and Chemical Properties of the Cold and Hot Water Extract from *Chondrus ocellatus* Holmes.

(pp. 1065～1069)

By T. Mori and Y. Tutiya.
(Department of Agriculture, Tokyo Imperial University; Received Oct. 28, 1939.)

On a Carbohydrase Acting on the Mucilage from *Chondrus ocellatus* Holmes (I).

(pp. 1070～1074)

By T. Mori.
(Department of Agriculture, Tokyo Imperial University; Received Nov. 6, 1939.)

On the Production of 2, 3-Butylene Glycol by Fermentation. I.

(pp. 1075～1084)

By Kinichiro Sakaguchi, Kisetsu Ôhara and Sumihiko Kobayashi.
(Agricultural Chemical Laboratory, Tokyo Imperial University; Received Oct. 16, 1939.)

Ten strains of bacteria, which form 2,3-butylene glycol in the yields of 30～40% (the maximum being 46%) from glucose, were isolated from soils and vegetable matters. Seven of these strains were found to belong to *Aerobacter aerogenes* and its related species and the other three to *Aerobacter cloacae* and its associates. Besides the glycol some of them form remarkable quantities of ethylalcohol.

The optimal conditions for the glycol production have been studied; i. e. the temperature 37～38°C, the pH value of the medium 6～7, and the concentration of glucose near 8%. As the nitrogen sources, 2～5% of powdered soy bean cake, fish meal or rice bran with the addition of small quantities of anmonium sulfate are suitable for the industrial production.

The formation of 2, 3-butylene glycol may be directly detected in the fermenting culture media by the application of Voges-Proskauer's test after the treatment of the media with dilute sulfuric acid and a solution of potassium permanganate.

On the Hydrolysis of Fats and Fatty Acid Esters. (III).

(pp. 1085～1096)

By Toyoki Ono.
(Chemical Laboratory of the Fish Meal Association of Japan; Received Oct. 26, 1939.)

Hydrolysis of Fats and Oils by Pancreas and Ricinus Lipase.

(A) Method of Examination.

On pancreas lipase:

Weigh 0.2 g of the sample into a 20~30 cc bottle, add 5 cc of distilled water, 0.5 cc of 2% $CaCl_2$ and 0.5 cc of 3% albumin, and emulsify the content by shaking for 5 minutes. Add 2 cc of Clark and Lubs' phosphate buffer solution and 2 cc of pancreas-glycerin extract, shake for 5 minutes, and hydrolyse at 40°, 20°, 0° and −7°C. After a certain length of time, free fatty acids are

Table IV. The Hydrolysis of Fats and Oils by Lipase.

I. Ricinus Lipase

Oil / t (min)	Olive oil	Tsubaki oil	Linseed oil	Perilla oil	Castor oil	Chicken fat	Sardine oil	Whale oil	Salmon oil
30°C	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
30	57.30	50.34	51.58	38.61	41.35	54.86	28.46	20.74	23.20
90	70.80	83.33	68.68	69.10	62.41	73.00	36.12	35.30	33.74
180	82.49	94 80	80.22	80.00	62.54	90.30	43.00	38.60	42.70
300	84.31	95.35	81.81	82.15	79.70	92.71	43.75	41.00	43.06
0°C									
120	7.30	3.82	7.56	—	5.34	—	5.34	3.70	6.00
300	—	—	—	20.14	27.07	4.90	24.65	—	—
1020	41.61	44.44	57.70	63.20	—	12.50	—	33.58	27.32
2400	—	50.00	72.46	83.33	74.74	17.30	61.43	73.73	—

II. Pancreas Lipase

Oil / t (min)	Olive oil	Japan wax	Linseed oil	Perilla oil	Cocoa-nut oil	Chicken Fat	Sardine oil	Whale oil	Salmon oil	Butter Fat
30°C	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
30	25.26	6.70	22.38	15.52	21.69	21.21	37.09	34.08	27.49	20.11
60	34.92	12.00	55.67	18.34	34.58	30.83	44.22	40.00	42.54	26.35
120	52.01	17.01	46.16	24.69	46.90	45.26	49.22	51.11	49.84	36.06
180	59.44	18.04	54.55	39.40	58.60	51.63	53.51	57.78	52.36	43.69
240	67.61	19.33	61.54	62.40	65.65	58.70	57.08	60.00	55.63	45.77
300	71.33	20.75	67.14	63.47	71.51	60.11	60.00	66.67	59.00	47.16
0°C										
60	13.37	6.70	10.91	8.46	7.97	8.42	15.41	16.15	8.51	—
180	19.76	6.78	12.59	10.86	11.02	9.19	24.55	25.48	11.78	11.23
300	21.25	6.82	17.48	11.45	12.66	9.95	28.23	31.11	18.98	19.28
480	23.03	6.88	20.84	17.50	14.07	11.03	30.53	34.37	23.69	—
900	26.75	7.48	24.48	21.16	19.00	12.25	31.67	41.48	28.01	24.69
1200	27.50	7.73	28.40	25.11	21.34	13.48	32.81	48.00	37.30	34.00
−7°C		Tsubaki oil				Cod liver oil				
120	4.90	12.17	—	13.41	—	9.40	12 55	8.15	10.73	10.40
300	5.65	22.91	—	22.00	—	17.00	14.27	15.11	12.44	11.10
1200	20.81	24 75	—	34.13	—	25.12	26.83	32.89	24.90	12.76
1500	23.48	25.71	—	35.54	—	29.74	27.28	34.08	37.96	17.66

in neutralized with $N/10$ KOH solution, adding 40 cc alcohol.

On ricinus lipase:

Weigh 0.4 g of the sample, add to it 2 cc of water, 2 cc of acetate buffer solution and 1 cc of castor-seed-water extrat, shake for 3 minutes, and then treat the same manner as above mentioned.

(B) Results.

The experimental results are given in Table IV.

(I) The pancreas lipase has more active hydrolytic power on fish oils, at lower temperatures, than the ricinus lipase, but vegetable oils are more hydrolysed at 30°C by the ricinus lipase than by the former.

(II) The action of ricinus lipase is extremely retarded by the higher unsaturated fatty acids produced during the hydrolysis fish oils.

Studies on Acetone-Butyl Alcohol Fermentation.

(II). Fermentation of Mono-Saccharides by *Bac. granulobacter pectinovorum* and *Bac. butanolo-aceloni.*

(pp. 1097~1110)

By Sigeyosi Horie.

(Agricultural Chemical Laboratory, Kyusyu Imperial University, Fukuoka;
Received Oct. 23, 1939.)

On the Cellulose Analysis and Bleaching Methods of Cellulose Materials.

Part II. Application of a New Method of Cellulose Estimation on Various Plant Analysis.

(pp. 1111~1117)

By Sin-iti Honda.

(The Institute of Chemical Reserch; Received Oct. 4, 1939.)

In order to test the value of the present author's new cellulose estimation method, several plant materials were analysed by this method. In Table I, it is seen that bleaching powder method gave higher figures for total cellulose as well as for α-cellulose content than the ordinary chlorine gas method as in the case given in Part I of this paper.

Moreover, the procedures of the new method are simpler and can be carried out in shorter time than the ordinary Cross and Bevan method. Therefore, we may recommend this bleaching powder method for the estimation of plant celluloses. The purity of total cellulose and α-cellulose obtained by this new method

Table I. Comparison of plant cellulose contents by different analitical methods with various materials.

(Oven dry state.)

Name of plants.	Analysis by bleaching powder					
	Total cellulose (%)	α-cellulose (ash-free) (%)	In total cellulose			
			α-cellulose (ash-free) (%)	α-cellulose ash (%)	β-cellulose (%)	γ-cellulose (%)
Hosobaisotutuji (*Ledum palustre* L. var. *vulgare* Ledeb.	42.21±0.36	30.30±0.82	71.80±2.55	1.00	27.20	
Goyo no matu (*Pinus koraiensis* Sieb. et Zucc.)	56.03±0.06	39.12±0.08	69.82±0.08	0.23	19.85	
Hitujigusa (*Poa glumaris* Trin.)	47.52±0.46	34.45±0.87	72.51±1.80	0.99	7.75	18.75
Rice straw (*Oryza sativa* L. Asahi.)	42.56±0.51	30.70±0.25	72.80±0.81	2.34	30.70	—
Himemizugoke (*Sphagnum Fimbritum*, Wils.)	40.41	23.83	58.99	0.00		
Tundra, Surface layer	30.75	—	46.93	—	—	
〃 deep layer	25.84	—	—	—	—	

Name of plants.	Usual chlorine gas method.					
	Total cellulose (%)	α-cellulose (ash-free) (%)	In total cellulose			
			α-cellulose (ash-free) (%)	α-cellulose ash (%)	β-cellulose (%)	γ-cellulose (%)
Hosobaisotutuji (*Ledum palustre* L. var. *vulgare* Ledeb.	36.78±0.60	25.44±0.67	69.67±0.74	0.70	29.62	
Goyo no matu (*Pinus koraiensis* Sieb. et Zucc.)	52.55±0.09	34.37±0.41	65.41±1.0	—	34.59	
Hitujigusa (*Poa glumaris* Trin.)	44 10±0.49	32.53±0.88	73.77±1.16	—	26.33	
Rice straw (*Oryza sativa* L. Asahi.)	40.75±0.22	30.21±0.18	73.31±0.84	1.15	30.21	—
Himemizugoke (*Sphagnum Fimbrrtum*, Wils.)	20.84	8.83	34.08	—	65.92	
Tundra, Surface layer	30.67	—	49.78	—	—	—
〃 deep layer	17.43	—	—	—	—	—

will be discussed in a forthcoming paper.

(Forest Chemical Laboratory, Department of Agriculture, KyotoImperial University.)

The Influence of Monochromatic Lights on the Action of Enzymes.

Report [XXIV～XXV.]

(pp. 1118～1124)

By Reitaro Murakami.

(Agricultural College, Utunomiya; Received Oct. 10, 1939.)

A Nitra-lamp was used to investigate the influence of the visible monochromatic lights on the action of the saccharase and proteinase in the yeast.

The enzyme solutions were irradiated through the layer of copper sulphate solution and the monochromatic filters of red, green, blue and viole, teach possessing three different intensities. Colorless and black filters passing respectively all and no visible rays were also used for controls.

The preparation of the enzymes, the measurement of the enzyme action and the other treatments were the same as in the author's previous papers.(1)

In this experiment, the actions of the yeast saccharase and proteinase were promoted by the visible monochromatic lights. The promotion was found to be stronger with the relative intensities of the absorbed rays, but to show the inverse effect in comparison with an unit intensity of all visible lights. The effect of monochromatic lights on the actions of saccharase and proteinase was found to be approximately proportional with the wave number.

(1) Bull. Agri. Chem. Soc. (Japan), **15**, 45, 79, (1939).